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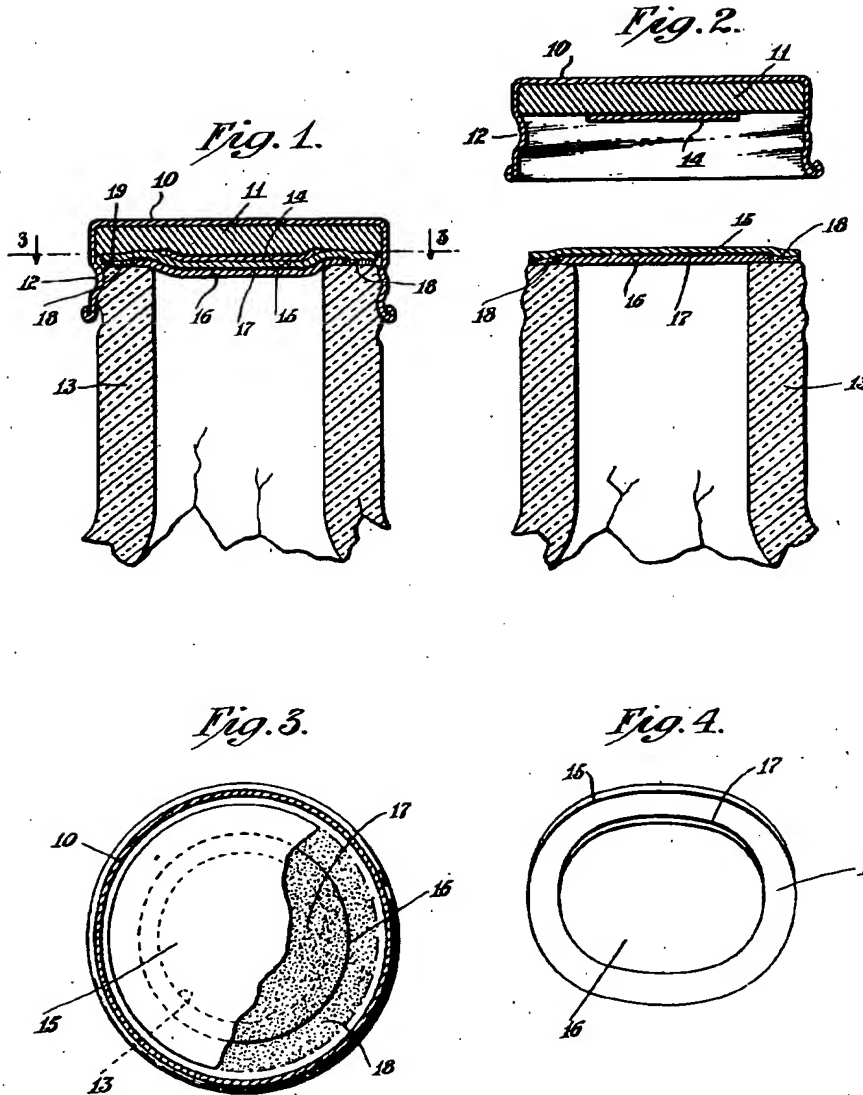
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J. GUTMANN

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BOTTLE CLOSURE

Filed Dec. 27, 1932



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## UNITED STATES PATENT OFFICE

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## BOTTLE CLOSURE

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The invention relates to bottle closures, and more particularly to a type of closure wherein the primary sealing of the container is effected by means of a closure disk spanning the opening in, and lapping and permanently bonded to the top of, the container outlet, the action of this disk being supplemented by a secondary seal consisting of a closure cap having a gasket therein known as a "re-seal" cap, pressure of said gasket against the container outlet through the portion of the primary sealing disk lapping the top of said outlet, being developed and maintained by the means attaching the cap to the container, irrespective of the degree of resiliency inherent to the material of the gasket.

Closures of the type to which the invention relates are extensively used for sealing containers used in the packaging of liquids, such closures being particularly desirable to prevent or to indicate tampering with the container contents as by the dilution of such contents or the removal of the contents of the original package and the substitution of a different or an inferior material therefor.

Such closures are used in producing what is known as a "tamper proof" container, since notwithstanding that the primary sealing disk may be readily broken or removed, the breakage of this disk, or its absence, clearly indicates to the consumer that the contents of the container are not those of the original package.

Prior to my invention, it was necessary to determine not only what material for the sealing disk was suitable for use in the packaging of each particular liquid or other composition, but also what adhesive or cement was suitable for use in forming the bond between said disk and the container outlet, since a disk material or adhesive which is immune to deterioration by the action thereon of one substance, is destructible by the action thereon of another substance. It was also essential to use materials in the disk and for forming the bond with regard to their action upon the liquid contents of a container.

When packaging some liquids having a highly volatile content, the type of closure

above referred to cannot be advantageously used, because it has been found that the volatile matter, at normal temperatures, will separate from its vehicle and escape from the container, notwithstanding that a liquid tight seal is afforded by such a closure. Furthermore, such matter may weaken the bond between the disk and the container outlet, so that with the removal of the re-seal cap there is likelihood of the sealing disk separating from the container outlet, and thus destroying the "tamper proof" nature of the closure. To prevent the escape of the volatile matter, a degree of compression of the gasket of the re-seal cap, beyond that capable of development by a cap applying machine used in this art, would be required.

With the above conditions in mind, I have provided a closure wherein the surface of the primary sealing disk, presented towards the container, will not only be protected from deterioration from contact with the contents of the container, but will be made sufficiently impermeable to the volatile constituents of the contents of the container, to prevent the escape thereof and a resultant lowering of the quality of such contents.

In addition to this protection of the sealing disk, the protecting medium is utilized to prevent contact of the contents of the container and of the volatile matter therein with the adhesive or cement forming the bond between the primary sealing disk and the top of the outlet, thus precluding likelihood of the weakening or destruction of the bond to an extent to permit the escape of the volatile matter, or result in the separation of the disk from the container when removing the gasket containing closure cap from the container.

With the use of a closure embodying the invention, the container is provided with a triple seal, that afforded by the adhesive or cement used in bonding the primary sealing disk to the top of the outlet; that afforded by the protecting medium in relation to the primary sealing disk itself and to the adhesive or cement bonding same to the container, and lastly, that afforded by the gasket contained within the cap.

Such a closure possesses the very great

advantage that the only properties required in the material of the primary sealing disk and of the adhesive or cement used in bonding same to the container, are those which will best lend themselves to the permanent bonding of this disk to the top of the outlet and which will possess sufficient strength to guard against accidental rupture of the disk. In fact, the properties of the material of this disk, and of the adhesive or cement used, in their relation to any particular liquid to be packaged, may be disregarded.

Of course, cost of production is also a factor since it is essential to produce such closures in large volume at low cost by reason of the nature of their use.

The invention consists primarily in a bottle closure embodying therein a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, and of a diameter to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, and a stratum of bonding material securing said disks together; and in such other novel features of construction and combination of parts, as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawing,

Fig. 1 is a sectional view, upon a large scale, showing a closure embodying the invention applied to the outlet of a container with one construction of re-seal cap;

Fig. 2 is a similar view showing the relation of parts after removal of the re-seal cap;

Fig. 3 is a section on the line 3—3, partly broken away; and

Fig. 4 is a perspective view of the composite disk.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawing, it is illustrated in connection with a re-seal cap comprising a metal shell 10 having therein a packing gasket 11 of any suitable type, and provided with a skirt 12 by means of which said cap may be applied to a container outlet shown at 13. The skirt 12 and the exterior of the container outlet are provided with any well known form of co-operating means whereby, with the attachment of the cap to the bottle, it will be drawn downwardly so as to press the gasket 11 against the neck of the bottle with sufficient pressure to form a substantially liquid-proof seal about the top of the neck of the container. This form of re-seal cap is old and well known in the bottle closure art,

various forms and arrangements of packing gaskets being used.

In the drawing, I have shown a packing gasket formed of resilient material having the central portion thereof protected with what is known as a "center spot" 14 for preventing contact of the contents of the container with the material of the packing gasket. No particular form of cap gasket, however, is required in the closure of the invention, so long as there is a sufficient area adjacent the skirt 12 to develop pressure about the top of the container outlet through the sealing disks in a manner to increase the effectiveness of the seal afforded by said disks, when forming the bond between the primary sealing disk and the top of the container outlet, and while the cap remains on the container.

Within the shell 10, adjacent the gasket 11, is a composite sealing disk adapted to be permanently bonded to the top of the container outlet 13 when applying the closure to a container. This composite disk is retained in the shell 10 by frictional engagement of its edge with the skirt 12, or in any other desired manner making it and the re-seal cap readily separable one from the other when removing the "re-seal cap" from a container, while retaining the disk in the shell until the closure is applied to a container by the usual cap applying machine.

The composite sealing disk comprises a base disk 15 of a thin, non-compressible material affording an effective anchorage for an adhesive or cement. This disk 15 may be of thin paper, or any other flexible material having sufficient strength to resist accidental rupture, and may be so treated as to make it translucent so as to make the appearance of the container outlet more pleasing after the removal of the "re-seal" cap and the portion of the disk closing said outlet.

The material of which the disk 15 is composed may be determined by the factors of the effectiveness of the bond which may be secured between it and the top of the container outlet and of sufficient inherent strength to prevent accidental rupture. Absorptiveness to a limited degree is desirable as affording a more effective anchorage for the adhesive or cement used in bonding the disk to the container.

Permanently bonded to the face of the base disk 15 to be presented toward the container, is a facing disk 16 of metal foil, varnished or otherwise treated paper, or other flexible material having the properties of being non-absorbent, impermeable to the volatile constituents of the contents of a container and immune to deterioration from contact of the contents of a container therewith.

The facing disk 16 is permanently secured to the base disk 15 by an interposed stratum of any suitable bonding material 17, such as

gutta-percha tissue, or an adhesive having a lac, albumen, casein, sodium silicate or other well known base. The character of the bonding medium used is immaterial, since it never contacts with the container contents, being protected therefrom by the disk. The bonding material used is determined by the manufacturing methods employed in producing the closure and the effectiveness of the bond between the two disks.

To facilitate the bonding of the base disk 15 to the top of the outlet of the container 13, and to prevent contact of the contents of a container with the adhesive or cement used in forming such bond, with a resultant destruction of the permanency of the bond and contamination of the contents of the container, the facing disk 16 is of a diameter sufficiently smaller than that of the primary or base sealing disk 15 to expose a sufficient area of that portion of the base disk adjacent its edge and overlapping the top of the container outlet to ensure an adequate width of bond between the disk and the container. The diameter of said facing disk 16 is, however, sufficiently great to completely span the opening of the container outlet and slightly overlap upon the top of said outlet to form a barrier between the material bonding the primary or base sealing disk 15 and the opening in said outlet. To afford a more effective barrier, the disk 16 is formed of material of a thickness greater than that of the stratum of adhesive or cement, indicated at 18, bonding the edge of the disk 15 to the top of the container outlet.

In the drawing, the bonding area of the disk 15 about the disk 16 is shown at 19.

In producing closures embodying the invention, the metal shell and its contained gasket 11 are formed and assembled in the usual or any desired manner. The primary or base disks 15 may be cut from a strip of material and deposited within the shell 10 by a special assembling machine, the facing disks 16 being applied to the material of the base disk and bonded thereto by the stratum 17 after the disk 15 has been deposited in the shell, or in spaced relation upon the strip prior to the cutting of the disks 15 therefrom. Extreme accuracy in the positioning of the axes of the disks 15 and 16 is unnecessary.

Frictional engagement of the edge of the disks 15 with the skirt 12 ensures the retention of the disk within the shell until the closure as a whole is applied to a bottle or other container.

The bonding stratum 18 may be in the form of a dry adhesive applied directly to the exposed area 19 upon the disk 15, or it may be applied while viscous to the top of the outlet 13 of the bottle or other container during the procedure of applying the closure thereto. Ordinarily, the latter procedure is

followed, a feeding and adhesive attachment being used with the ordinary closure applying machine.

With the latter procedure, the adhesive or cement forming the stratum 18 is applied to the top of the outlet of the container while it is being conveyed to the cap applying mechanism. The cap 10 is then applied to the container outlet, the co-operating attaching members, carried by the skirt 12 and the container outlet 13, drawing the cap 10 downwardly as a result of the turning thereof by the applying mechanism until the exposed area 19 of the sealing or base disk 15 contacts with the adhesive and is forced into close bonding relation with the top of the container.

The slight turning action of the disk 15, following its initial engagement therewith, spreads the adhesive or cement, and the subsequent pressure of the gasket 11 removes any surplus cement by extrusion toward the skirt 12 of the shell 10, the edge of the facing disk 16 preventing excess adhesive cement being forced toward the opening in the container outlet, excepting possibly a minute quantity which may be engaged by the disk 16 adjacent its edge.

By allowing the cap 10 to remain upon the bottle, the disks 15 and 16 are maintained under a continuing pressure by the gasket 11 until the adhesive or cement in the stratum 18 has set.

By making the facing disk 16 of a diameter to cause a narrow strip thereof adjacent its edge to overlie the top of the container outlet, contact of the container contents with the material of the primary sealing or base disk 15, where it may attack same above the bonding stratum 18, is prevented.

By using a disk 16, greater in thickness than the stratum 18 of adhesive or cement, the contents of a container, whether liquid or volatile, are substantially wholly excluded from contact with the material of the stratum 18.

The interposition of the disk 16 between the disk 15 and the opening in the container outlet, prevents contact of the contents of a container with the portion of the primary sealing or base disk 15 within the opening of the container outlet and with the bonding stratum 17 between the two disks.

The portion 19 of the primary sealing or base disk 15, in conjunction with the bonding stratum 18, affords an edge seal about the opening in the container outlet. The portion of said disk spanning the outlet opening has no sealing action, but serves as a support for the facing disk 16 which not only seals the top of the opening, but the top edge thereof in a manner to protect the bonding stratum 18 in the manner above described. The packing gasket 11 supplements the above sealing action of the disks 15 and 16.

While the edge portion of the disk 16 overlying the top of the container outlet protects the sealing stratum 17 from the bottle or other container contents, I prefer to have the area of the bonding stratum 17 coincident with that of the disk 16.

The cap 10 and its gasket 11, when applied to a bottle after the removal of the disks 15 and 16, or when used as a "re-seal" cap, closes the container outlet in the manner usual with such caps.

A closure embodying the invention is particularly adapted for use in closing bottles containing vanilla and other flavoring extracts, and various toilet and drug compounds having a fairly high alcoholic and volatile content. It is not designed for use with carbonated or other beverages containing gases under high pressure since it will not resist high pressures.

In producing closures embodying the invention, the adhesive or cement forming the stratum 18 may have a lac, casein, albumen, sodium silicate or other base, according to the effectiveness of such in securing a permanent bond between the top of the container outlet and the area 19 of the disk 15, and according to the bottling or packaging methods employed and has material of the container, which ordinarily is glass.

The closure may be considered one of universal application, inasmuch as the material of the facing disk 16 and the protection afforded thereby to the bonding stratum 18 are such as to permit the use of the closure in sealing containers which are filled, not only with such liquids or other materials as will not deleteriously affect the old type of closure herein referred to, but practically all of those liquids or substances with which said old form of closure could not be used. It is particularly adapted for use in closing containers used in the packaging of liquids or other material having a highly volatile content, the loss of which would deleteriously affect the quality of same. While there is a possibility of some volatile matter escaping, the triple seal afforded by the closure of the invention will reduce this to a minimum.

By using a sealing gasket 11 provided with a center spot 14, this cap, when used for "re-seal" purposes, has all the advantages of the ordinary center spot sealing cap.

As heretofore pointed out, the use of the closure of the invention permits the formation of the bonding at 18 by means of an adhesive or cement which will secure the desired permanency of the union of the primary sealing disk with the container outlet without regard to the possible effect of the container contents upon this bond or of the bonding material upon such contents. This is due to the tertiary seal afforded by the facing disk 16 in its relation to the bonding stratum 18.

It is not my intention to limit the inven-

tion to the particular materials used in the composite disk beyond the necessity for such materials possessing those characteristics specifically referred to.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A bottle closure embodying therein a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, and of a diameter to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, and a stratum of bonding material securing said disks together.

2. A bottle closure embodying therein a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container and of a diameter to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, a stratum of bonding material between the exposed portion of the primary sealing disk and the top of the outlet of a container, said facing disk being of a thickness greater than that of said stratum of bonding material, and a stratum of bonding material securing said disks together.

3. A bottle closure embodying therein a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, of a diameter to span the opening in, and overlie the top of, a container outlet, and to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, a stratum of bonding material between the exposed portion of the primary sealing disk and the top of the outlet of a container, said facing disk being of a thickness greater than that of said stratum of bonding material, and a stratum of bonding material securing said disks together.

4. A bottle closure embodying therein a re-seal cap including a shell having a skirt provided with means adapted to engage co-operating means upon the outlet of a container to draw said shell toward the container, a sealing gasket within said shell and a composite sealing disk within said shell adjacent said sealing gasket and separable

therefrom and from said shell comprising a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, and of a diameter to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, and a stratum of bonding material securing said disks together.

5. A bottle closure embodying therein a re-seal cap including a shell having a skirt provided with means adapted to engage co-operating means upon the outlet of a container to draw said shell toward the container, a sealing gasket within said shell and a composite sealing disk within said shell adjacent said sealing gasket and separable therefrom and from said shell comprising a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container and of a diameter to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, a stratum of bonding material between the exposed portion of the primary sealing disk and the top of the outlet of a container, said facing disk being of a thickness greater than that of said stratum of bonding material, and a stratum of bonding material securing said disks together.

7. A bottle closure embodying therein a re-seal cap including a shell having a skirt provided with means adapted to engage co-operating means upon the outlet of a container to draw said shell toward the container, a sealing gasket within said shell, a center spot permanently bonded to said sealing disk and a composite sealing disk within said shell adjacent said sealing gasket and separable therefrom and from said shell comprising a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, of a diameter to span the opening in, and overlie the top of, a container outlet, and to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, a stratum of bonding material between the exposed portion of the primary sealing disk and the top of the outlet of a container, said facing disk being of a thickness greater than that of said stratum of bonding material, and a stratum of bonding material securing said disks together.

6. A bottle closure embodying therein a re-seal cap including a shell having a skirt provided with means adapted to engage co-operating means upon the outlet of a container to draw said shell toward the container, a sealing gasket within said shell and a composite sealing disk within said shell adjacent said sealing gasket and separable therefrom and from said shell comprising a thin, non-compressible, primary sealing disk of a material affording an anchorage for an adhesive or cement, and of a diameter to span and lap the top of a container outlet, a facing disk of non-absorbent, impermeable material immune to deterioration from contact with the contents of a container, of a diameter to span the opening in, and overlie the top of, a container outlet, and to expose said primary sealing disk adjacent its edge to facilitate the bonding of said primary sealing disk to a container, a stratum of bonding material between the exposed portion of the primary sealing disk and the top of the outlet of a container, said facing disk being of a thickness greater than that of said stratum of bonding material, and a stratum of bonding material securing said disks together.

In witness whereof I have hereunto affixed my signature this 22 day of December, 1932.

JESSE GUTMANN.

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